Trend Study 11B-14-05

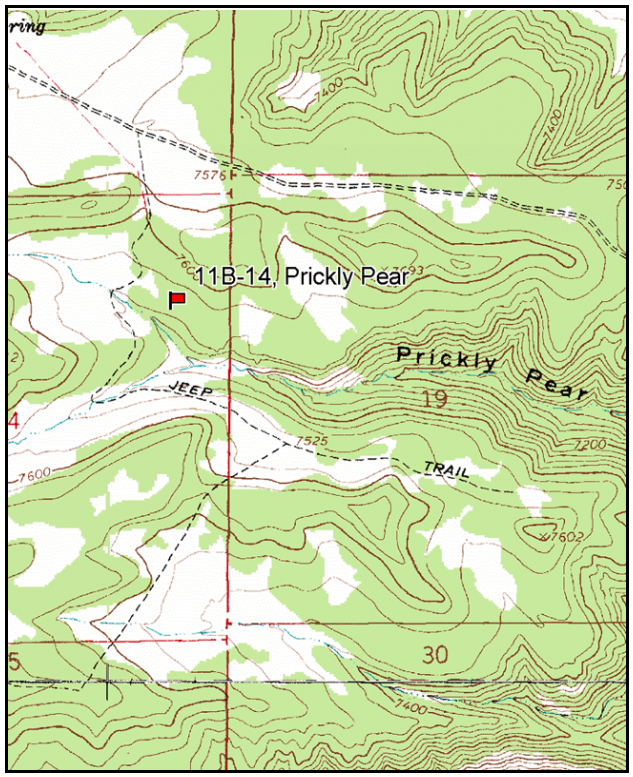
Study site name: Prickly Pear . Vegetation type: Chained, Seeded P-J .

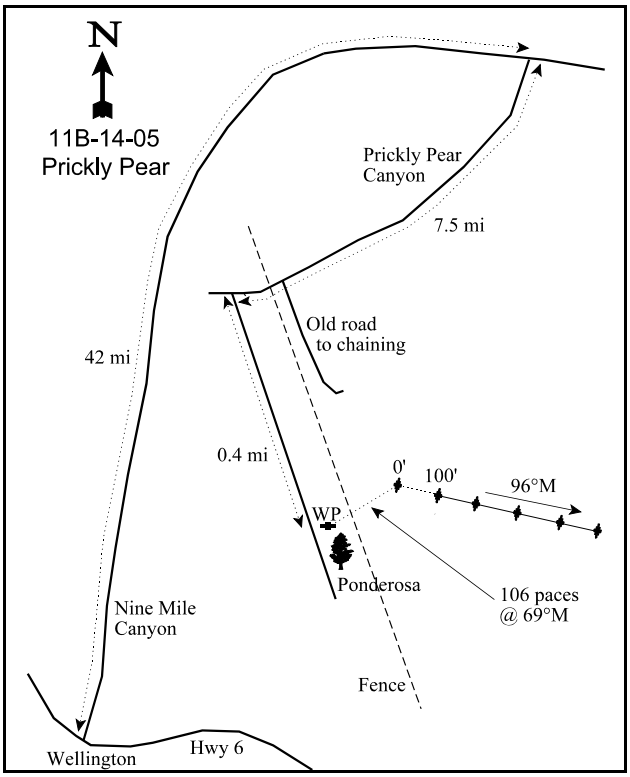
Compass bearing: frequency baseline 96 degrees magnetic.

Frequency belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft). No Rebar on belts.

LOCATION DESCRIPTION

In Wellington at the intersection of Highway 6 and Nine Mile Canyon Road drive 42 miles northeast down Nine Mile Canyon to the Prickly Pear turnoff. Turn right (south) and travel up Prickly Pear Canyon 7.5 miles to a fork just beyond a fence. Turn left (south) and travel 0.4 miles to a large Ponderosa pine tree on the east side of the road. A witness post is just north of the tree. From the witness post walk 106 paces at 69°M crossing the fence to the 0 foot base line post.





Map Name: Currant Canyon

Diagrammatic Sketch

Township 12S , Range 14E , Section 24

GPS: NAD 27, UTM 12S 4401517 N, 560899 E

DISCUSSION

Prickly Pear - Trend Study No. 11B-14

This study was established in 1994 and is located at the head of Prickly Pear Canyon at 7,540 feet in elevation on a southwest aspect. The transect is near the edge on a slightly sloping (12%) flat narrow ridge that runs west to east into Nine-Mile Canyon. It was not selected necessarily because of current elk use, but for the anticipated increase in elk winter use the future. The importance of the site to elk is evidenced by a pellet group frequency in 1994 of 21% compared to only 8% for deer. Pellet group frequency was much lower in 2000, perhaps due to the mild winter of 1999-2000. In 2005, pellet group frequency was also low, although the winter provided much more precipitation. Pellet group in 2000 was estimated at 22 elk, 9 cow, and 8 horse days use/acre (54 edu/ha, 23 cdu/ha and 20 hdu/ha). No deer pellet groups were encountered. In 2005, estimated pellet group data was 15 elk, 2 deer, 7 cow, and 3 horse days use/acre (38 edu/ha, 5 ddu/ha, 16 cdu/ha, and 9 hdu/ha). The area was chained and seeded in the mid-1970's and is currently grazed by livestock and horses as part of the Stone Cabin allotment, which is grazed on a deferred rotation schedule from May through September. Herbaceous production is poor and grasses on the site were heavily utilized by livestock in 2000. Use on grasses was light in 2005, as is expected from the fewer cow pats observed in 2005. Oil and gas exploration has expanded throughout the Nine Mile Canyon area. A new drill pad had been established just 500 feet beyond the end of the baseline. New roads associated with the oil exploration have also been established.

The soil is moderately deep and rocky with an estimated effective rooting depth of just over 14 inches. It has a clay loam texture with slightly alkaline pH of 7.6. Phosphorus was measured at just 2 ppm, where values less than 6 ppm may limit normal plant growth and development in wildland soils (Tiedemann and Lopez 2004). Small shale fragments and larger flat pieces of sandstone are common on the surface and throughout the soil profile. Combined rock and pavement contributed 24% relative cover in 1994, 27% in 2000, and 29% in 2005. Bare ground is high and litter cover is low, with most litter coming from pinyon and juniper debris from the chaining. Some erosion is taking place but it is minimized by the slight slope combined with the armored nature of the soil surface. The erosion condition class determined soil movement as slight in 2005 due to moderate pedestalling, moderate litter and soil movement, and small rills and flow patters on the sites.

Browse is very limited on this site with browse cover values of only 3% in 1994, 5% in 2000, and 8% in 2005. Total relative vegetation cover is not very high at only 13% to 15%. Similar sites have on average more than twice the vegetation cover. Site potential (number of young individuals versus dying individuals) appears to be low when compared to other comparable sites within the Range Creek unit. Key browse on this site consist of small numbers of true mountain mahogany and rubber rabbitbrush. Mahogany was estimated at 220 plants/acre in 2000, with over one-half of the population showing moderate to heavy use on both readings. Even with moderate to heavy use, vigor was good. No seed was produced in 2000, likely due to the extremely dry conditions. The lack of seed production was reflected in a low population number in 2005, 160 plants/acre. Rubber rabbitbrush also has had a relatively small population (480 plants/acre in 1994, 320 in 2000, and 260 in 2005). They were heavily utilized in 1994. However, use was light to moderate in 2000 and light in 2005. The most common shrub on the site is corymbed eriogonum, which has increased in density from 1,880 plants/acre in 1994 to 3,140 in 2005. These shrubs have showed little use.

Released pinyon and juniper trees are growing back within the chaining. Point-center quarter data from 2000 estimated 92 pinyon and 31 juniper trees/acre. Most trees were small with an average basal diameter estimated at 3.3 inches for pinyon and 3.6 inches for juniper. In 2005, the density of pinyons had increased to 140 trees/acre and junipers to 37 trees/acre. The average basal diameters were 2.3 inches for pinyon and 2.7 for juniper, which would suggest that there were more young trees sampled in 2005. In fact, 70% of the pinyon and 56% of the juniper sampled were between 1-4 feet tall. Five percent of the juniper and pinyon trees sampled in 2000 and 2005 were mature chained trees that are still alive.

The herbaceous understory is poor and produces only ~9% cover. The only fairly common grasses include Salina wildrye and crested wheatgrass, which have produced between 4-5% cover combined. Forbs are diverse but the only common species are indicative of shallow soil. The most common species include: stemless goldenweed, fineleaf hymenopappus, bladderpod, gumweed aster and desert phlox. There is little useful forage produced by these forbs.

1994 APPARENT TREND ASSESSMENT

Soil trend appears to be in stable, but poor, condition with a high percentage of bare ground and rock as well as a low cover value for litter. The browse component is poor with very low densities and poor vigor. The herbaceous understory has one of the lowest cover values for this type of site, but it still has a fair amount of grass production from Salina wildrye and crested wheatgrass. Because of the low abundance for both crested wheatgrass and smooth brome, seeded when this woodland was chained, this low density could mostly be explained because of the prolonged drought we have had in the past 8 years. The Desirable Components Index score is very poor due to low browse cover and low perennial grass cover.

winter range condition (DC Index) - Very Poor (20) Moderate Potential scale

2000 TREND ASSESSMENT

Trend for soil is stable, but remains in poor condition. Relative cover values for vegetation, litter, and bare ground are similar to 1994 estimates. There is some erosion occurring but it is minimized by the gentle terrain combined with the armored nature of the soil surface. Trend for browse is also stable. Density of desirable browse species, mountain mahogany and rabbitbrush, are low yet stable. Vigor is generally good and percent decadence low. Density of other less desirable shrubs on the site also appear to be stable. The only negative aspect of the browse trend is the number of pinyon and juniper trees released on the chaining. They are not currently abundant and do not produce much cover, but they will eventually regain dominance of the site, especially without a vigorous competitive herbaceous understory. Trend for the herbaceous understory is down due to a decline in the sum of nested frequency of both grasses and forbs. The DCI score remained very poor.

TREND ASSESSMENT
soil - stable (0)
browse - stable (0)
herbaceous understory - down (-2)
winter range condition (DC Index) - Very Poor (20) Moderate Potential scale

2005 TREND ASSESSMENT

Trend for soil is stable. The ratio of protective ground cover (vegetation, litter and cryptogams) to bare ground remained unchanged. The trend for browse is stable. The key browse species, true mountain mahogany, population decreased 27%, but was already very low in density. Use increased from 36% heavy use in 2000 to 75% in 2005. This increased use is likely a product of the decrease in numbers since the number of animals (days use/acre) on the site decreased slightly. Despite the decrease in numbers and increase in use, the total cover increased. The population of rubber rabbitbrush also declined, a decrease of 19% from 2000 to 2005. Comparatively, decadent rabbitbrush individuals increased from 19% to 31% and dying individuals increased from 6% to 15% from 2000 to 2005. According to the point-center quarter data, the density of pinyon and juniper trees increased on the site as well. The herbaceous understory trend is slightly down. Sum of nested frequency decreased 13% for perennial grasses and 23% for perennial forbs. The DCI score remained very poor.

TREND ASSESSMENT
soil - stable (0)
browse - stable (0)
herbaceous understory - slightly down (-1)
winter range condition (DC Index) - Very Poor (25) Moderate Potential scale

HERBACEOUS TRENDS --
Management unit 11B, Study no: 14

Type	Species	Nested Frequency			Average Cover %		
		'94	'00	'05	'94	'00	'05
G	Agropyron cristatum	$_{b}$69	$_{b}$62	$_{a}$15	1.30	1.31	.20
G	Agropyron spicatum	-	9	-	-	.33	-
G	Bromus inermis	5	-	-	.01	-	-
G	Carex sp.	13	11	6	.25	.45	.04
G	Elymus salina	128	118	104	3.40	2.82	4.48
G	Oryzopsis hymenoides	$_{a}$2	$_{a}$2	$_{b}$50	.00	.03	1.80
G	Stipa comata	7	-	1	.01	-	.03
G	Stipa lettermani	3	-	-	.03	-	-
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		227	202	176	5.03	4.96	6.55
Total for Grasses		227	202	176	5.03	4.96	6.55
F	Antennaria rosea	-	5	-	-	.01	-
F	Arenaria fendleri	3	-	-	.03	-	-
F	Castilleja chromosa	2	-	10	.00	-	.02
F	Draba sp. (a)	-	3	-	-	.00	-
F	Euphorbia fendleri	10	-	6	.02	-	.04
F	Haplopappus acaulis	$_{a}$27	$_{b}$50	$_{ab}$35	.50	1.36	.52
F	Helianthella uniflora	20	15	18	.12	.08	.61
F	Hymenoxys acaulis	$_{b}$56	$_{a}$15	$_{a}$9	.24	.10	.05
F	Hymenopappus filifolius	54	30	34	1.20	.32	.68
F	Lesquerella sp.	$_{b}$135	$_{a}$37	$_{a}$19	.45	.13	.07
F	Lomatium sp.	-	-	1	-	-	.03
F	Lygodesmia sp.	-	-	1	-	-	.00
F	Machaeranthera grindelioides	67	68	43	.31	.74	.80
F	Pedicularis centranthera	-	-	7	-	-	.03
F	Penstemon palmeri	$_{b}$13	$_{b}$13	$_{a}$-	.06	.04	.00
F	Physaria acutifolia	$_{a}$2	$_{b}$14	$_{a}$-	.00	.03	-
F	Phlox hoodii	$_{b}$150	$_{b}$123	$_{a}$85	.80	1.13	.54
F	Schoencrambe linifolia	-	-	2	-	-	.00
F	Stanleya pinnata	-	-	-	-	-	.00

Type	Species	Nested Frequency			Average Cover %		
		'94	'00	'05	'94	'00	'05
F	Townsendia incana	13	12	13	.05	.05	.05
F	Unknown forb-perennial	37	-	12	.16	-	.25
Total for Annual Forbs		0	3	0	0	0.00	0
Total for Perennial Forbs		589	382	295	3.99	4.02	3.73
Total for Forbs		589	385	295	3.99	4.02	3.73

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 11B, Study no: 14

Type	Species	Strip Frequency			Average Cover %		
		'94	'00	'05	'94	'00	'05
B	Cercocarpus montanus	8	7	7	.69	1.50	2.75
B	Chrysothamnus nauseosus	13	10	11	.28	.15	.23
B	Chrysothamnus viscidiflorus	2	3	1	.00	-	-
B	Ephedra viridis	3	1	2	-	-	-
B	Eriogonum corymbosum	37	45	61	.85	1.22	2.59
B	Gutierrezia sarothrae	15	12	14	.10	.08	.07
B	Juniperus osteosperma	0	1	0	-	.03	.15
B	Pinus edulis	0	4	5	1.26	1.52	2.64
Total for Browse		78	83	101	3.21	4.50	8.46

CANOPY COVER, LINE INTERCEPT --
Management unit 11B, Study no: 14

Species	Percent Cover	
	'00	'05
Cercocarpus montanus	-	3.29
Chrysothamnus nauseosus	-	.86
Eriogonum corymbosum	-	2.29
Gutierrezia sarothrae	-	.33
Pinus edulis	.80	3.08

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 11B, Study no: 14

Species	Average leader growth (in) '05
Cercocarpus montanus	5.9

POINT-QUARTER TREE DATA --
Management unit 11B, Study no: 14

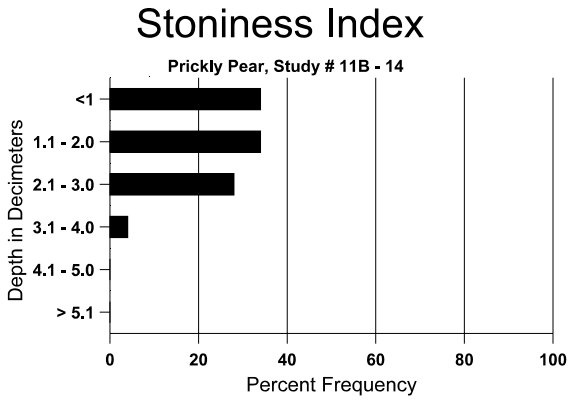
Species	Trees per Acre '00	Trees per Acre '05	Average diameter (in) '00	Average diameter (in) '05
Juniperus osteosperma	31	37	3.6	2.7
Pinus edulis	92	140	3.3	2.3

BASIC COVER --
Management unit 11B, Study no: 14

Cover Type	Average Cover % '94	'00	'05
Vegetation	12.62	13.89	17.20
Rock	15.38	13.51	9.51
Pavement	6.16	16.37	22.53
Litter	19.67	23.13	21.88
Cryptogams	.00	.06	0
Bare Ground	34.38	42.35	40.68

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 14, Study Name: Prickly Pear

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	ppm P	ppm K	dS/m
14.2	64.6 (16.3)	7.6	31.6	36.8	31.6	3.5	2.0	201.6	0.6



PELLET GROUP DATA --
Management unit 11B, Study no: 14

Type	Quadrat Frequency		
	'94	'00	'05
Rabbit	10	8	31
Horse	-	2	-
Elk	21	7	6
Deer	8	1	2
Cattle	-	-	1

Days use per acre (ha)	
'00	'05
-	-
56 (138)	4 (7)
23 (57)	15 (38)
-	2 (5)
10 (25)	7 (16)

BROWSE CHARACTERISTICS --
Management unit 11B, Study no: 14

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Amelanchier utahensis												
94	**0**	-	-	-	-	-	0	0	-	-	0	45/61
00	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Cercocarpus montanus												
94	**180**	-	-	180	-	20	44	22	-	-	0	29/36
00	**220**	100	-	220	-	-	18	36	-	-	0	32/47
05	**160**	40	-	160	-	-	13	75	-	-	0	42/52
Chrysothamnus nauseosus												
94	**480**	-	20	360	100	20	4	21	21	17	17	22/24
00	**320**	-	20	240	60	40	13	0	19	6	6	20/23
05	**260**	-	20	160	80	80	0	0	31	15	15	24/25
Chrysothamnus viscidiflorus												
94	**40**	-	-	40	-	-	0	0	0	-	0	5/8
00	**60**	-	-	40	20	-	0	0	33	33	33	4/7
05	**20**	-	-	20	-	-	0	100	0	-	0	-/-
Ephedra viridis												
94	**60**	-	20	20	20	-	33	0	33	-	0	16/19
00	**20**	-	-	20	-	-	0	100	0	-	0	16/10
05	**40**	-	20	20	-	-	50	0	0	-	0	21/19
Eriogonum corymbosum												
94	**1880**	40	660	1200	20	-	13	0	1	-	0	11/16
00	**2180**	180	580	1220	380	20	4	0	17	4	5	9/13
05	**3140**	1160	1320	1760	60	-	5	0	2	.63	.63	12/18

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Gutierrezia sarothrae												
94	**760**	-	120	600	40	60	0	0	5	3	3	5/6
00	**480**	-	-	480	-	-	0	0	0	-	0	4/6
05	**320**	20	20	300	-	-	0	0	0	-	0	7/9
Juniperus osteosperma												
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**20**	20	20	-	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Pinus edulis												
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**80**	60	60	20	-	-	0	0	-	-	0	-/-
05	**120**	-	100	20	-	-	0	17	-	-	0	-/-